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## PART I - ADMINISTRATIVE

### Section 1. General administrative information

Title of project

Evaluate Status Of Pacific Lamprey In Clearwater River Drainage, Idaho

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BPA project number: 20019

Contract renewal date (mm/yyyy):

☐ Multiple actions?

Business name of agency, institution or organization requesting funding

Idaho Department of Fish and Game

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Business acronym (if appropriate) IDFG

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Proposal contact person or principal investigator:

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NPPC Program Measure Number(s) which this project addresses

7.5F

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FWS/NMFS Biological Opinion Number(s) which this project addresses

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Other planning document references

Idaho Department of Fish and Game Fish Management Plan, 1996-2000; Columbia Basin Fish and Wildlife Authority Multi-year Implementation Plan; Nez Perce National Forest South Fork Clearwater River Landscape Assessment, 1998

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Short description

Determine the status and life history of Pacific lamprey in the Clearwater River drainage, Idaho, with emphasis in the South Fork Clearwater drainage.

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Target species

Pacific lamprey

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### Section 2. Sorting and evaluation

Subbasin

Clearwater River

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**Evaluation Process Sort**

CBFWA caucus	Special evaluation process	ISRP project type
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Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
<input checked="" type="checkbox"/> Anadromous fish <input type="checkbox"/> Resident fish <input type="checkbox"/> Wildlife	<input checked="" type="checkbox"/> Multi-year (milestone-based evaluation) <input type="checkbox"/> Watershed project evaluation	<input type="checkbox"/> Watershed councils/model watersheds <input type="checkbox"/> Information dissemination <input type="checkbox"/> Operation & maintenance <input type="checkbox"/> New construction <input checked="" type="checkbox"/> Research & monitoring <input type="checkbox"/> Implementation & management <input type="checkbox"/> Wildlife habitat acquisitions

### Section 3. Relationships to other Bonneville projects

***Umbrella / sub-proposal relationships.*** List umbrella project first.

Project #	Project title/description

#### ***Other dependent or critically-related projects***

Project #	Project title/description	Nature of relationship
9402600	Pacific Lamprey Research and Restoration	Provides lower Columbia Basin Life history information, methodology; lead for the Lamprey Technical Workgroup; analyzes genetic samples provided by Idaho.
8909800	Idaho Supplementation Studies	Collects ammocetes in traps
9107300	Idaho Natural Production Monitoring and Evaluation	Provides incidental observations
8332300	Smolt Monitoring at the Head of Lower Granite Reservoir and L. Granite Dam	Collects ammocetes in traps.
9801003	Monitor and Evaluate the Spawning Distribution of Snake River Fall Chinook	Provides locations of radio-tagged lamprey

### Section 4. Objectives, tasks and schedules

#### ***Past accomplishments***

Year	Accomplishment	Met biological objectives?

#### ***Objectives and tasks***

Obj 1,2,3	Objective	Task a,b,c	Task
1	Understand life history characteristics of ammocoetes, macrothemia and adult Pacific lamprey in the Clearwater Basin.	a	Determine age and size of outmigrants by collecting and measuring ammocoetes at downstream traps. Subsample to collect

			statoliths for aging and determine larval stage.
		b	Determine outmigration timing and strength by collecting ammocoetes and macrothemia with rotary screen traps at two locations in the S.F. Clearwater River.
		c	Determine age class distribution and density of ammocoetes, and estimate population size by electroshocking rearing habitat. Mark with Coded Wire Tags and photonic marks for later identification at traps, stream sites and downstream facilities.
		d	Determine length and age at transformation by rearing subsample of ammocoetes at Columbia River Research Laboratory.
		e	Determine adult spawning migration timing by radio-tagging individuals captured at Lower Granite Dam.
		f	Determine adult spawning period by monitoring radio-tagged individuals and conducting redd surveys. Collect carcasses to identify sex and age.
		g	Determine number and time of arrival of ammocoetes to mainstem dams by Coded Wire Tag detections.
0	Determine habitat requirements of juvenile and adult lamprey in the Clearwater Basin.	a	Identify adult pre-spawning and spawning habitat (water velocity, water depth, substrate, cover, temperature) by monitoring radio-tagged lamprey.
		b	Identify juvenile habitat (water velocity, water depth, substrate, cover, temperature) by electroshocking stratified sites.
3	Determine distribution of juveniles and adults in S.F. Clearwater River drainage	a	Collect all life history phases through trapping and electroshocking, and monitor radio-tagged lamprey.
		b	Construct GIS overlay using GPS coordinates obtained at collection and observation sites for all life history phases
4	Develop and implement strategies to minimize impacts to critical habitat and restore degraded habitat in the Clearwater Basin.	a	Work with land management agencies (USFS, BLM) to minimize impacts to lamprey critical habitat.
		b	Develop and implement restoration plans to improve and increase critical lamprey habitat within the Clearwater Watershed. Coordinate and cooperate with other agencies and watershed work groups.

### Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	10/1999	9/2003	Radio tag and monitor 20 adult lamprey annually		33.40%
2	10/1999	9/2003	Monitor radio tagged adults and collect 300 juveniles annually.		33.30%
3	10/1999	9/2003	Map all observed lamprey locations and develop GIS overlays for different life history phases.		33.30%
4	10/2003	9/2004	Develop restoration plans		
				<b>Total</b>	100.00%

### Schedule constraints

Completion date

2004

## Section 5. Budget

FY99 project budget (BPA obligated):

### FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	Fish Technician and Biological Aide	%31	36,904
Fringe benefits	@36.5%	%11	13,470
Supplies, materials, non-expendable property	Nets, chemicals, waders, radio tags (20), etc.	%9	11,000
Operations & maintenance	Vehicle rental, per diem	%9	10,600
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Rotary screen trap, CWT scanner	%19	22,300
NEPA costs		%0	
Construction-related support		%0	
PIT tags	# of tags:	%0	
Travel		%2	2,200
Indirect costs	@22.3%	%15	17,565
Subcontractor	University of Idaho	%4	5,000
Other		%0	
<b>TOTAL BPA FY2000 BUDGET REQUEST</b>			<b>\$119,039</b>

### Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount (\$)
IDFG	Administration, supervision,	%11	16,500

	additional field assistance		
Univ of ID	Graduate program, radio-tagging and monitoring assistance	% 1	2,000
USFWS	Radio-tag monitoring assistance	% 3	5,000
USGS	Raise ammocoetes to transformation	% 2	3,000
<b>Total project cost (including BPA portion)</b>			<b>\$145,539</b>

### ***Outyear costs***

	<b>FY2001</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>
<b>Total budget</b>	\$124,300	\$130,200	\$126,200	\$96,300

## **Section 6. References**

<b>Watershed?</b>	<b>Reference</b>
<input type="checkbox"/>	Bergstedt, R.A., W.D. Swink, and J.G. Seeyle. 1993. Evaluation of two locations for coded wire tags in larval and small parasitic phase sea lampreys. North American Journal of Fisheries Management 13:609-612.
<input type="checkbox"/>	Close D.A., M. Fitzpatrick, H. Li, B. Parker, G. James. 1995. Status Report of the Pacific Lamprey (Lampetra tridentata) in the Columbia River Basin. Project No. 94-026 prepared for BPA. Portland, OR.
<input type="checkbox"/>	Conservation Data Center. 1997. Species with Special Status in Idaho. Fourth edition. Idaho Department of Fish and Game, Boise, Idaho. 20 p.
<input type="checkbox"/>	Hawkins, C.P. and 10 coauthors. 1993. A hierarchical approach to classifying stream habitat features. Fisheries 18(6):3-12.
<input type="checkbox"/>	Idaho Department of Fish and Game. 1996. Fisheries Management Plan, 1996-2000. Idaho Department of Fish and Game, Boise, Idaho. 273 p.
<input type="checkbox"/>	Jackson, A.D., D.R.Hatch, B.L.Parker, D.A.Close, M.S. Fitzpatrick and H. Li. 1998. Pacific Lamprey Research and Restoration. Annual Report 1997. DOE/BP-39067-3.
<input type="checkbox"/>	Nez Perce National Forest. 1998. South Fork Clearwater River Landscape Assessment. USDA Forest Service.
<input type="checkbox"/>	Northwest Power Planning Council. 1994, amended 1995. Columbia River Basin Fish and Wildlife Program. As amended in 1995. Portland, Oregon.
<input type="checkbox"/>	Pajos, T.A. and J.G. Weise. 1994. Estimating populations of larval sea lamprey with electrofishing methods. North American Journal of Fisheries Management 14:580-587.
<input type="checkbox"/>	Platts, W.S., W.F. Megahan, and G.W. Minshall. 1983. Methods for evaluating stream, riparian and biotic conditions. U.S. Forest Service General Technical Report INT-221.
<input type="checkbox"/>	Richards, J.E., R.J. Beamish and F.W.H. Beamish. 1982. Descriptions and keys for ammocoetes of lamprey from British Columbia, Canada. Canadian Journal of Fisheries and Aquatic Sciences 39:1484-1495.
<input type="checkbox"/>	Roper, B. and D.L. Scharnecchia. 1996. A comparison of trap efficiencies for wild and hatchery age-0 chinook salmon. North American Journal of Fisheries Management 16:214-217.
<input type="checkbox"/>	Simpson J. and R.L. Wallace. 1978. Fishes of Idaho. The University Press of Idaho. Moscow, ID.
<input type="checkbox"/>	Summerfeldt, R.C. and L.S. Smith. 1990. Anesthesia, surgery and related techniques. Pages 213-272 in C.B. Schreck and P.B. Moyle, editors. Methods for Fish Biology. American Fisheries Society, Bethesda, Maryland.
<input type="checkbox"/>	Volk, E.C. 1986. Use of calcareous elements (statoliths) to determine age of sea lamprey ammocoetes (Petromyzon marinus). Canadian Journal of Fisheries and Aquatic Sciences 43:718-722.

<input type="checkbox"/>	Wydowski, R.S. and R.R. Whitney. 1979. Inland Fishes of Washington. University of Washington Press, Seattle, Washington.
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

## PART II - NARRATIVE

### Section 7. Abstract

The Pacific lamprey *Lampetra tridentatus* is an anadromous fish species facing the same migratory hazards as other anadromous fish in Idaho. Problems with habitat and the Snake River and Columbia River migratory corridors are unquestionably impacting Idaho's Pacific lamprey. Because Pacific lamprey are not recognized as a sport or game fish in Idaho, little attention has been given to the species, though they are considered endangered by the State of Idaho. While improving salmon and steelhead river passage will benefit passage for Pacific lamprey, maintaining critical freshwater habitat for spawning and juvenile rearing is just as important for their survival. The Fish and Wildlife Plan Measure 7.5F addresses the declining status of Pacific lamprey within its natural range and the need to provide funding for projects that will support a restoration effort. Currently, the farthest upstream that Pacific lamprey are being studied is the Walla Walla River in the Lower Mid-Columbia Basin. The proposed project will add to our knowledge of the Pacific lamprey's life history and habitat requirements in the Lower Snake Subregion. Data collected will identify both juvenile and adult migratory behavior and timing, and describe habitat for multi-year freshwater juvenile rearing and adult spawning. Measuring habitat parameters such as water depth and velocity, substrate, cover and temperature at collection or observation sites will help describe preferred habitats. Collecting migratory juveniles by rotary traps will provide information on size and age of larvae and timing of movement out of Idaho. Radio-tagged adults will provide information on upstream migrational timing, prespawning habitat locations and needs, spawning periodicity, locations and necessary habitat. Preserving Pacific lamprey populations in Idaho depends on understanding habitat needs and protecting that critical habitat during this time of problems with the Snake and Columbia rivers migratory corridors.

### Section 8. Project description

#### a. Technical and/or scientific background

The Pacific lamprey *Lampetra tridentatus* is the only lamprey species believed to exist in Idaho (Simpson and Wallace 1978), and is an anadromous fish species facing the same migratory hazards as other anadromous fish species in Idaho. All native anadromous species are at risk to extinction. Coho salmon *Oncorhynchus kisutch* have officially been listed as extinct in Idaho. Sockeye salmon *Oncorhynchus nerka* are at a remnant level and listed as endangered under the federal Endangered Species Act (ESA). Fall chinook *Oncorhynchus tshawytscha* salmon are listed as threatened under ESA throughout its natural range. Spring and summer chinook salmon are listed as threatened in most of their natural range in Idaho. Wild summer steelhead trout *Oncorhynchus mykiss* are also listed as threatened in their natural range in Idaho.

A status review of Pacific lamprey prepared for the Bonneville Power Administration (BPA) (Close et al 1995) indicated that Pacific lampreys have declined to only a remnant of their pre-1940's populations, and outlined potential factors affecting declines. Among these were problems with habitat and the migratory corridor, which have impacted other anadromous fish species in Idaho. Since Pacific lamprey have not been recognized as a sport or game fish in Idaho, little research attention has been given to them (Simpson and Wallace 1978). However, the State of Idaho considers Pacific lamprey to be

endangered and imperiled (Conservation Data Center, 1997) and we will consider and use our knowledge of the species to maintain or enhance their numbers, genetic integrity and habitat (IDFG 1996). Basic distribution, life history and population status are urgently needed (Close et al 1995) to fully understand this species and to begin intensive management before extinction occurs and supplementation programs are implemented.

Only one concerted effort has been made in Idaho to address Pacific lamprey. Hammond (1979) studied larval biology of Pacific lamprey in the Potlatch River, ID, a tributary of the lower Clearwater River. He also provided limited information on juvenile lamprey from three other stream systems in Idaho (Lolo Creek, Clearwater River, Salmon River). The status review (Close et al 1995) stated that understanding the cause of decline through various data gathering and research efforts will be critical to implementing effective restoration actions for Pacific lamprey in the Columbia River Basin.

In the South Fork Clearwater River basin of north central Idaho, the Idaho Department of Fish and Game (IDFG) presently has several ongoing projects that are providing limited data on Pacific lamprey. The BPA funded Idaho Supplementation Studies (ISS, project 8909800) and Idaho Natural Production Monitoring and Evaluation (INPME, project 9107300) projects have provided trap catches and incidental observations of lamprey since 1992. In addition, IDFG in coordination with the Nez Perce National Forest (NPNF) and the U.S. Bureau of Land Management (BLM) has been conducting a comprehensive bull trout *Salvelinus confluentus* inventory survey of the drainage for the past five years. Because of the information gathered from ongoing projects, the South Fork Clearwater River basin lends itself well to the proposed project. Pacific lamprey are relatively abundant in the system, the other projects can complement data collection, and suitable juvenile rearing habitat as described by Hammond (1979) and Wydowski and Whitney (1979) is abundant.

#### **b. Rationale and significance to Regional Programs**

Restoration of Pacific lamprey in the Columbia River basin will provide for a healthy ecosystem through biological diversity of native fish species, nutrient input and as a food source. The Fish and Wildlife Plan, measure 7.5F, has addressed the declining status of Pacific lamprey in the Columbia River basin and the need to provide funding for projects that will support this restoration effort. As a result of the Status Review on Pacific Lamprey (Close et al 1995), the Northwest Power Planning Council (NPPC) asked that an “ad hoc” Columbia Basin Pacific Lamprey Technical Work Group (TWG) form and prepare a workplan that provides guidance in implementing the Status Review’s recommendations. At its October 1998 meeting in Pendleton, OR, the Lamprey TWG agreed that all ongoing projects funded by BPA and other sources, as well as other proposed BPA-funded research, were important in furthering the understanding and management of Pacific lamprey in the Columbia River Basin. The meeting also facilitated the exchange of information between researchers and assured coordination that limited duplication of work. IDFG, as a member of the TWG will provide information learned in a timely manner to members and continue to coordinate so that we can adapt the project to new findings and techniques as needed.

#### **c. Relationships to other projects**

This investigation will be coordinated with five ongoing projects funded under FWP. The ISS, the INPME and the Smolt Monitoring at the Head of Lower Granite Reservoir and Lower Granite Dam are projects that in the past have provided numbers, size and timing of outmigration for Pacific lamprey juveniles as they migrate downstream. Rotary screen traps operated on Red and American rivers in the South Fork

Clearwater drainage for the ISS project will continue to collect information on trapped lamprey. Visual and electroshocking observations will be conducted by the INPME project in conjunction with that it's goals in the Clearwater and Salmon drainages. The Smolt Monitoring project operates travelling screen traps on the Snake and Salmon rivers in Idaho, and can provide timing of out-migration for lamprey leaving those systems.

Pacific lamprey were provided by IDFG to the Columbia River Inter-tribal Fish Commission (CRITFC) in 1998 in cooperation for their genetic inventory under the Pacific Lamprey Research and Restoration project (9402600) administered by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). We will continue to provide a limited number of lamprey as needed to complete genetic analysis. We will also provide lamprey ammocoetes to the US Geological Survey Columbia River Research Laboratory for their work in rearing to transformation and developing a key to identify juvenile lamprey of the Pacific Northwest (J. Bayer, pers. comm.).

Radio-tag monitoring will be enhanced through the cooperation of the University of Idaho's (UI) salmon and steelhead tracking program, and the U.S. Fish and Wildlife Service (USFWS) adult fall chinook project (Monitor and Evaluate the Spawning Distribution of Snake River Fall Chinook, #9801003). Both maintain mobile and fixed receivers that will be able to monitor radio-tagged lamprey in the Snake and Clearwater rivers.

**d. Project history** (for ongoing projects)

No previous history.

**e. Proposal objectives**

1. Understand life history characteristics of ammocoetes, macrothemia and adult Pacific lamprey in the Clearwater Basin.

We generally know little about the basic life history of Pacific lamprey in Idaho. The study will provide information regarding status of juvenile distribution, abundance, timing of juvenile outmigration, age structure and larval stage of outmigrants, adult spawning distribution, timing and abundance. This data will provide us and others important information to better manage the species.

2. Determine habitat requirements of juvenile and adult Pacific lamprey in the Clearwater Basin.

General habitat requirements of Pacific lamprey will be compiled and used in commenting on land management activities that may impact critical habitat. This information will be useful for the NPNF and BLM when they develop their watershed and land use plans, and for the Clearwater Basin Advisory Group (BAG) and S.F. Clearwater Watershed Advisory Group (WAG) as they develop Best Management Practices (BMP's) that protect water quality and beneficial uses as mandated by Idaho law. The Clearwater Focus Watershed will also be able to use the information to guide restoration efforts.

3. Determine distribution of juvenile and adult life history phases in the S.F. Clearwater River drainage.

Knowing the distribution of Pacific lamprey will help us understand how this species utilizes specific streams and habitats. This information will be critical in developing restoration plans and reducing impacts to critical habitat. The information will guide the NPNF, BLM, Clearwater BAG, the S.F. Clearwater WAG and Clearwater Focus Watershed in their respective areas.



4. Develop and implement strategies to minimize impacts to critical habitat and restore degraded habitat in the Clearwater Basin.

Based on known life history phase distribution and habitat use, we can develop strategies to protect critical areas from any impacts caused by land management activities (grazing, mining, silviculture). We plan to work closely with the NPNF, and the BLM to develop these strategies and incorporate them into work plans of these agencies. We will also develop habitat restoration plans to enhance the quality and quantity of Pacific lamprey habitat in the drainage, working with the two federal agencies listed above as well as the Clearwater (BAG) and S.F. Clearwater (WAG) which are responsible for developing BMP's to improve water quality in the Basin.

The preservation of the present levels of Pacific lamprey in Idaho is important for the continued survival of this species until the migration corridor problems associated with the dams on the lower Snake and Columbia rivers are corrected. Understanding population composition of juvenile fish, their migrational periodicity and habitat needs of juveniles and adults will provide for more intense management to perpetuate this species. Without this knowledge, preservation of critical habitat may be lost. With the many land management activities (timber harvest, road building, instream gold dredge mining) presently occurring in the South Fork Clearwater River, it is paramount that the freshwater habitat needs for this species be completely understood. The stated objectives will add to our knowledge of this species and provide the critical information necessary to minimize future degradation of lamprey habitat. Results of this project will be published as a graduate thesis, progress and annual reports, peer-reviewed journals and presentations to professional societies. We will exchange information at the LWG meeting and among members throughout the year as needed. Specific products of this study will include syntheses of the life history of juvenile and adult Pacific lamprey, and their habitat use and requirements in the S.F. Clearwater River drainage.

#### **f. Methods**

Tasks associated with Objective 1:

Tasks a and b: Downstream moving larval lamprey will be collected at floating rotary screw traps (E.G. Solutions, Inc) operated during the months of March through October, or until ice break-out and formation in Red and American rivers. All captured lamprey will be anesthetized with MS-222 (Summerfeldt and Smith, 1990), measured for length and weight, and examined for Coded Wire Tags (CWT) and photonic marks (PT) (New West Technologies). In the absence of any CWT and PT, lamprey will be given a CWT (Bergstedt et al 1993) and PT specific to the trap location. Animals will be noted for larval stage if possible (Richards et al 1982), given a V-notch punch in its dorsal fin, allowed to recover, and released 0.5 km above the trap to estimate trap abundance and efficiency (Roper and Scharneccia 1996). A subsample of larval lamprey will be retained for later determination of age through statolith collection (Volk 1986) and larval stage (Richards et al 1982). Water temperature will be recorded using a continuous recording HOBO-Temp (Onset Corporation) and water stage height recorded for later determination of stream discharge. Larval lamprey captured at traps in the mainstem Snake and Salmon Rivers will be measured for length and weight, and released. Migration timing will be noted. This information will be used to compare to that gathered elsewhere. Aging at all sites will also be accomplished by grouping lengths as described by Hammond (1979). Date and number of lamprey caught will be recorded at all sites.

Task c: **Distribution** of larval lamprey will be determined by randomly selecting two 100 m transects per kilometer and electroshocking one 50 m reach within each transect in habitat known to be preferred by Pacific lamprey ammocoetes (Wydowski and Whitney 1979, Hammond 1979). Electroshocking methods for sea lamprey (Pajos and Weise 1994) and Pacific lamprey in Oregon (Jackson et al 1997) will be used, and will occur after runoff and before ice formation. All captured lamprey will be anesthetized with MS-222 (Summerfeldt and Smith 1990), measured for length and weight, and examined for CWT and PT marks. In the absence of any CWT and PT, lamprey will be given a CWT (Bergstedt et al 1993) and PT specific to the date and sampling location. This will allow us to identify areas within each stream that contribute outmigrants caught in the traps, and to identify fish in subsequent captures within the stream and at downstream facilities. Animals will be noted for larval stage if possible (Richards et al 1982). A subsample of larval lamprey will be retained for later determination of age through statolith collection (Volk 1986) and larval stage (Richards et al 1982).

Task d: We will provide a maximum of 50 ammocoetes collected during electroshocking to the Columbia River Research Laboratory for rearing to transformation. Length, sex and age will be determined. After transformation, the lamprey will be used for part of the basin-wide genetic analysis.

Task e and f: Adult Pacific lamprey (20) will be captured at Lower Granite Dam (the last Snake River Dam prior to entering Idaho) and outfitted with radio tags using methods developed by the UI for Pacific lamprey in the Lower Columbia River (R. Ringe, pers. comm.). Length and weight will be recorded, and lamprey will be examined for CWT and PT marks. The progress of these fish as they migrate into Idaho for spawning will be monitored with fixed radio receivers maintained by the USFWS, and by mobile receivers operated by IDFG project personnel. The radio tagged fish will be followed throughout their migration into their spawning streams, the timing and stream entered coordinated with an ongoing steelhead trout radio tagging study conducted by the UI. Adult Pacific lamprey will then be monitored throughout the spawning season by both radio-tracking and visual observation to determine timing and location of spawning activity. Redd counts will be conducted weekly throughout the spawning period. Characteristics of redds and redd areas will be measured, including redd dimensions, habitat type (Hawkins et al 1993), water velocity and depth, substrate size and amount of cover or shading (Platts et al 1983). Recovered carcasses will be examined for length, sex and age by statolith (Volk 1986).

Task g: We will coordinate with Corps of Engineers and Washington Department of Fisheries personnel working at mainstem Snake and Columbia rivers dams to get dates of arrival for any CWT lamprey detected in their systems.

Tasks associated with Objective 2:

Task a: Hammond (1979) describes juvenile habitat as sandy, silt substrate, preferably in backwaters and quiet eddies (Wydowski and Whitney 1979). Red, American and the mainstem South Fork Clearwater rivers will be mapped as to the availability of this type of substrate. Sampling sites will be the same as those described under Objective 1, Task c. At each individual location of capture, we will characterize habitat types (Hawkins et al 1988), and identify and measure substrate type, silt temperature, water depth, water velocity, water

temperature, gradient, instream and riparian cover, and light intensity (Platts et al 1983, Jackson et al 1997).

Task b: Habitat used by adult lamprey, prespawning and spawning, will be determined by locating these fish by radio-tagging or by random encounter. All parameters described above for juvenile lamprey, except for silt temperature, will be measured. The locations of adult spawning will be described by the same parameters listed above with more intensive substrate analysis as to percentage of substrate size classes.

Tasks associated by Objective 3:

Tasks a and b: Distribution of juvenile and adult rearing and spawning locations will be determined by capture or observation of individual fish within their natural habitat in the South Fork Clearwater River drainage. Global Positioning System (GPS) coordinates will be recorded at each site where any life history stage is observed, as well as those sites sampled without lamprey. Locations of these fish by life history stage will be provided on GIS overlays for use in management planning for preservation of critical habitat in the drainage.

Tasks associated with Objective 4:

Tasks a and b: We will work closely with the NPNF and BLM to protect critical habitat and develop habitat restoration plans for the S.F. Clearwater River drainage. We will also work with other agencies and private entities (Clearwater BAG, S.F. Clearwater WAG, Clearwater Focus Watershed) to develop protection and restoration plans for other drainages where Pacific lamprey occur.

**g. Facilities and equipment**

The project will be administered from the IDFG Clearwater Region office in Lewiston, ID. IDFG has three field facilities in the South Fork Clearwater River drainage that will be utilized for housing and equipment storage during the field season, expected to be from March through October. IDFG will provide necessary field vehicles for use by the project. Laboratory, office space and necessary computers are available at the Lewiston regional office.

High cost equipment necessary for conducting the project will include the purchase of a five foot diameter rotary screw trap, a minimum of 20 radio tags for each of three years, and a portable radio tag receiver. Other IDFG equipment will be utilized to collect additional data. These include the ISS's rotary screen screw trap operated on Red River, Idaho's Intensive Smolt Monitoring Study's travelling screen traps located on the Snake River at Lewiston, Id. and Salmon River at Whitebird, ID., and the stationary and portable radio receivers of the UI and USFWS.

**h. Budget**

Personnel costs including benefits total \$50,374 for both the principal investigator (fish technician) and seasonal biological aides. Salaries for both positions are for 12 month equivalency. Supplies in the amount of \$11,000 include purchase of 20 radio tags, nets, wader, etc., for field operations. Vehicle rental and per diem (\$10,600) include rental mileage on a suitable field vehicle provided by IDFG, field groceries, and 20 monitoring air flights. Capital acquisitions for the first year of the project include purchase of a rotary screen trap and a coded wire tag scanner. Travel expenses (\$2,200) will allow the principal investigator to attend meetings for coordination purposes. The indirect cost (\$17,656) of 22.3% is the standard administrative charge of IDFG. The identified subcontractor is the University of Idaho, Department of Fish and Wildlife, who will administer the graduate program for the principal investigator. The proposed budget for the subcontractor will allow reimbursement for graduate advisor time and some travel expense funds for assisting in field work.

## Section 9. Key personnel

Project Manager: Tim Cochnauer Ph.D.

Position: Regional Fish Manager, Idaho Department of Fish and Game, Clearwater Region

Address: Idaho Department of Fish and Game  
Clearwater Region  
1540 Warner  
Lewiston, ID 83501

Phone: 208-799-5010

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Education: Doctorate in Fishery Resources, 1983, University of Idaho, Moscow, ID

MS in Zoology, 1973, University of Oklahoma, Norman, OK

BS in Zoology, 1967, University of Oklahoma, Norman, OK

### Current responsibilities:

As regional fish manager I have responsibility for both anadromous and resident fish populations and fisheries within the Clearwater Region of north central Idaho. The area encompasses the entire Clearwater River drainage, the Snake River drainage up to Hells Canyon Dam, the Palouse River drainage and the Salmon River drainage (North side) from its mouth upstream to Horse Creek (rkm 300). The Clearwater Region has a staff of four fishery scientists conducting a variety of activities including data collection, creel census, management decisions, setting and implementing fishing seasons, etc. throughout the region. The staff has responsibility for the FWP funded Idaho Supplementation Study and Natural Production Monitoring and Evaluation projects within the region.

I have over twenty years with the Idaho Department of Fish and Game working both in fish research and fish management. Experience include radio-tagging and monitoring a variety of fish species found in Idaho, marking and monitoring chinook salmon and steelhead trout juveniles and adults during the rearing, spawning and migratory phases of their lives, using a variety of sampling techniques for capturing different life history phases of different species of fish. These techniques include electroshocking, gill nets, angling, instream rotary screen and travelling screen traps, seining, instream weiring.

### Publications:

Cochner, T. 1992. Idaho Rarest Fish. Idaho Wildlife. Idaho Department of Fish and Game.  
Boise ID

Cochner, T., E. Schriever, and J. Brostrom. 1993. River and Stream Investigations. F-71-R-17.  
Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochner, T., E. Schriever, and J. Brostrom. 1994. River and Stream Investigations. F-71-R-18.  
Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochner, T., E. Schriever, and J. Brostrom. 1995. River and Stream Investigations. F-71-R-19.  
Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochner, T., E. Schriever, and J. Brostrom. 1996. River and Stream Investigations. F-71-R-20.  
Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Project Co-manager: Jody Brostrom

Position: Regional Fishery Biologist, Idaho Department of Fish and Game, Clearwater Region

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Clearwater Region  
1540 Warner Ave  
Lewiston, ID 83501

Phone: 208-799-5010

FAX: 208-799-5012

Education: Graduate work towards MS in Fish and Wildlife Management, 1984-1987, Montana State University, Bozeman, MT (Thesis pending)

BS Fisheries Resources, BS Wildlife Resources, 1981, University of Idaho, Moscow, ID

Current responsibilities:

I am responsible for both anadromous and resident fish management activities in the South Fork Clearwater drainage. I oversee and conduct the BPA-funded ISS project in the South Fork Clearwater drainage, and the INPME project in the Clearwater, Snake and Salmon basins administered out of Lewiston, ID. I also supervise the NPNF and BLM funded bull trout inventory and radio-tagging project in the South Fork Clearwater drainage. The majority of information obtained on Pacific lamprey in the Clearwater basin has been on projects that I have supervised.

I have over twelve years with the Idaho Department of Fish and Game working both in fish research and fish management, resident and anadromous fish. Experience includes rotary screen trapping and PIT-tagging chinook salmon, steelhead trout and bull trout, radio-tagging and tracking bull trout, and using a variety of sampling techniques for capturing and marking different life history phases of different species of fish. These techniques include electroshocking, gill nets, trap nets, angling, travelling screen traps, seining, instream weiring, redd surveys, adult trapping. I have conducted riparian and stream habitat surveys, designed and constructed riparian fences, and written cooperative agreements between IDFG and private landowners for riparian enhancements.

Publications:

Cochnauer, T., E. Schriever, and J. Brostrom. 1993. River and Stream Investigations. F-71-R-17. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1994. River and Stream Investigations. F-71-R-18. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1995. River and Stream Investigations. F-71-R-19. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Cochnauer, T., E. Schriever, and J. Brostrom. 1996. River and Stream Investigations. F-71-R-20. Federal Aid in Sport Fish Restoration. Idaho Department of Fish and Game.

Principal Investigator: Fishery Technician (Graduate student) To be assigned

Education: Individual must have completed requirements for bachelor's degree and accepted as a graduate student at the University of Idaho.

## **Section 10. Information/technology transfer**

Quarterly and annual reports, STREAMNET and Lamprey Workgroup Exchange. Presentations to professional society meetings. Publication in masters thesis and peer-reviewed journals.

**Congratulations!**